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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,721	11/24/2003	Stefan Thesen	P03,0473	5388
26574	7590	01/24/2008		
SCHIFF HARDIN, LLP PATENT DEPARTMENT 6600 SEARS TOWER CHICAGO, IL 60606-6473			EXAMINER KIM, CHONG R	
			ART UNIT 2624	PAPER NUMBER
			MAIL DATE 01/24/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/720,721

Applicant(s)

THESEN, STEFAN

Examiner

Charles Kim

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 6-12 is/are rejected.
- 7) ☒ Claim(s) 2-5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Requirement for Information under 37 CFR 1.105***

1. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

In response to this requirement, please provide copies of each publication which any of the applicants authored or co-authored and which describe the disclosed subject matter of real-time fMRI image analysis.

In addition, please provide the title, citation and copy of each publication that any of the applicants relied upon to develop the disclosed subject matter that describes the applicant's invention, particularly as to developing the concept of updating the intermediate results from a directly preceding volume data set with new calculations. For each publication, please provide a concise explanation of the reliance placed on that publication in the development of the disclosed subject matter.

### ***Claim Objections***

2. Claim 1 is objected to because the phrase "sequence of the of the data sets" in line 10 is grammatically incorrect. It appears Applicant intended the phrase to read "sequence of the data sets." Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 6-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Applicant's admitted prior art (hereinafter "Admission") and the article entitled "Real-Time Functional Magnetic Resonance Imaging" by Cohen (hereinafter "Cohen").

Referring to claim 1, Admission discloses all the claimed features except for the steps of storing the intermediate results and updating the intermediate results from a directly preceding volume data set with new calculations [Specification, Background section, page 2, last paragraph to page 4]. This feature lacking in Admission is taught by Cohen, who discloses a real-time fMRI image analysis process that includes determining intermediate results (t-statistic or correlation coefficient) for volume data sets, storing the intermediate results, and subsequently updating the intermediate results from a directly preceding volume data set with new calculations [pages 210-11, section titled "Statistical Image Processing". Cohen explains that the value of  $r$  is updated based on the stored values as each new image arrives].

Admission and Cohen are combinable because they are both concerned with fMRI image analysis techniques. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Admission so that the intermediate results are stored and updated from a directly preceding volume data set with new calculations, as taught by Cohen. The reason for doing so would have been to provide the capability of real-time fMRI image

analysis. Therefore, it would have been obvious to combine Admission with Cohen to obtain the invention as specified in claim 1.

Referring to claim 6, Cohen further discloses loading only one data set into a working storage of a data processing system, and after the calculations, discarding the loaded data set [pages 210-211, section titled "Statistical Image Processing"].

Referring to claim 7, Cohen further discloses cycling the data sets in parallel with the measurements [pages 208-217].

Referring to claim 8, Cohen further discloses interrupting the cycle of the data sets after a predeterminable number of measurements, and presenting a current result of the measurements, and after the interruption, continuing the cycle [pages 208-217].

Referring to claim 9, Admission further discloses acquiring the data sets from a subject volume by functional imaging, with the data sets originating from temporally successive measurements representing volume data sets, and with the time curve for an independent random sample comprised in the data set corresponding to the temporal signal curve of a volume element acquired in the subject volume [pars. 7-9].

Referring to claim 10, see the rejection of at least claim 1 above. Cohen further discloses a data acquisition and processing arrangement for performing the method described in claim 1 [pages 210-214 and figure 11].

Referring to claims 11-12, Cohen further discloses that the data acquisition device is a functional magnetic resonance system [pages 210-214 and figure 11].

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Applicant's admitted prior art (hereinafter "Admission") and the article entitled "Real-Time Multiple Linear Regression for fMRI Supported by Time-Aware Acquisition and Processing" by Smyser et al. (hereinafter "Smyser").

Referring to claim 1, Admission discloses all the claimed features except for the steps of storing the intermediate results and updating the intermediate results from a directly preceding volume data set with new calculations [Specification, Background section, page 2, last paragraph to page 4]. This feature lacking in Admission is taught by Smyser, who discloses determining intermediate results (t-statistic, regression coefficient, sums of squares, standard errors of regression coefficients) for volume data sets, storing the intermediate results, and subsequently updating the intermediate results from a directly preceding volume data set with new calculations [page 290-295. Note that for each volume data set, intermediate results (regression outputs) are determined and stored. Because intermediate results are determined for each subsequent volume data set, the intermediate results from a directly preceding volume data set are updated with new calculations for a subsequent volume data set.].

Admission and Smyser are combinable because they are both concerned with fMRI image analysis techniques using general linear models (GLM). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Admission so that the intermediate results are stored and updated from a directly preceding volume data set with new calculations, as taught by Smyser. The reason for doing so would have been to allow substantial parametric analysis to be performed and displayed in real time [Smyser, page 298]. Therefore, it

would have been obvious to combine Admission with Smyser to obtain the invention as specified in claim 1.

***Allowable Subject Matter***

5. Claims 2-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 571-272-7421. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

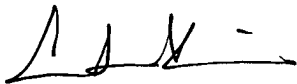
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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January 17, 2008